REMARKS

This is a simultaneous amendment with request for continued examination (**RCE**) filed under 37 C.F.R. 1.114 in response to the final Office Action dated February 8, 2008.

I. SUPPORT FOR THE NEW CLAIMS IN THE ORIGINALLY FILED DISCLOSURE

New method claims 22 to 27 have been filed and the previously pending method claims 15 to 21 have been canceled.

Claims 22 and 23 claim the embodiments of the applicants' method in which the thickness of the moving glass sheet is measured at the cutting tool as the cutting tool moves across the glass sheet and the applied cutting force is automatically adjusted as a function of the measured thickness as the cutting tool moves across the glass sheet so that the cutting force is greater at positions where the glass sheet is thicker and smaller at positions where it is thinner. The features and limitations of claims 22 and 23 are generally supported by the disclosures on page 4, lines 8 to 13; page 6, lines 4 to 6; and page 8, lines 26 to 28 of the applicants' specification.

More specifically, claim 22 corresponds to canceled claim 16, but contains new limitations, for example the limitation that the glass sheet is a moving glass sheet that moves in the travel direction shown on applicants' fig. 1. Steps a), b), and c) of new claim 22 are supported by the disclosure on page 7, lines 4 to 9, and lines 16 to 19, of the originally filed specification. Note particularly the

disclosure in lines 5 and 6 of page 7 that states that the glass sheet is cut "while the sheet is moving" and the disclosure in lines 16 to 19 of page 7 that states that the cutting head is pressed against the glass sheet with a predetermined amount of force and forms the fissure "when the cutting head moves".

With respect to step d) of new claim 22 note that page 8, lines 26 to 28, of applicants' specification states that the thickness of the sheet is continuously measured "during cross cutting" and that the cutting force is <u>automatically</u> adjusted as a function of measured thickness. Also note the disclosure on page 4, lines 10 to 13, which states that the cutting force is greater in regions in which the thickness is greater and smaller in regions in which the thickness is smaller.

With respect to the last paragraph of claim 22 which differs somewhat from the last paragraph of claim 16, note that the object of the invention is to prevent <u>premature</u> breakage of the glass sheet during formation of the fissure -- prior to step e) and that the cutting force is controlled for that purpose. The changes in the last paragraph of this independent claim relative to the version in claim 16 are supported by the disclosure on page 3, lines 18 to 20, of the originally filed specification and also canceled claim 1.

Dependent claim 23 contains the subject matter of canceled claim 21 and depends on claim 22.

New method claims 24 to 27 claim the embodiments of the applicants' method in which the thickness variations or exact thickness values across the glass sheet are first measured in an initial measurement or else based on prior experience or prior measurements during production of flat glass and then a

variable cutting force is applied to the glass sheet in different regions of the glass sheet as the cutting tool moves across the glass sheet during the formation of the fissure, which varies according to the prior measured thickness values so that the cutting force is larger in regions in which the thickness is greater and *vice versa*.

Independent method claim 24 is generally similar to canceled claim 15, but includes more precise wording and additional limitations to further distinguish its subject matter from the prior art. More specifically, steps a), b), and c) are the same as steps a), b), and c) of claim 22 and have the same basis. Like the method of claim 22 the method claimed in claim 24 includes providing a continuously moving glass sheet and cutting the fissure with a cutting tool that moves across the glass sheet at an angle to the travel direction. Step d) of claim 24 and the wording regarding the different "regions" of the glass sheet are supported by the disclosures on page 7, line 25, to page 8, line 19, especially page 8, lines 17 to 19, of applicants' specification. Also note the disclosure on page 4, lines 10 to 13, which states that the cutting force is greater in regions in which the thickness is greater and smaller in regions in which the thickness is smaller. The last paragraph of claim 24 is the same as claim 22 and further limits the values of the cutting force applied in the different regions.

Dependent claim 25 is substantially the same as dependent claim 9, which was filed in the simultaneous amendment with the original US National Stage application papers. For the foregoing reasons the subject matter of dependent claim 25 is part of the original disclosure at the time of filing.

Dependent claim 26 is similar to claim 19 and is supported by the

disclosure in applicants' originally filed specification at page 5, lines 21 to 25. Dependent claim 27 is substantially the same as canceled claim 18 and is also supported by the disclosure at page 8, line 30, to page 9, line 2, of applicants' specification. Dependent claim 28 is substantially the same as canceled claim 20.

II. ANTICIPATION REJECTION

Claims 15, 17, and 20 were rejected as anticipated under 35 U.S.C. 102 (b) by Bier, et al (US Patent 3,756,104 – referred to as "Bier" herein below).

Claims 15, 17, and 20 have been canceled, obviating their rejection on the foregoing grounds for obviousness. However new independent claim 24 includes the features of claim 15 and further limitations to distinguish the subject matter of claim 24 from the cited prior art, namely Bier. New dependent method claim 28 is substantially the same as canceled claim 20.

The following limitations in the applicants' independent method claim 24 are **not** <u>disclosed</u> in Bier:

(1) cutting <u>a continuously moving glass</u> sheet with a cutting tool moving across the glass sheet <u>at an angle to its travel direction</u> (**step a to c** of claim 24);

(2) a method of cutting that includes measuring a varying thickness of the glass sheet (**step d** of claim 24) to find how the thickness varies in different regions of the glass sheet, such as the edge region and the net region; and

(3) adjusting the cutting force applied by the cutting tool in different

regions across the glass sheet according to thickness variations measured during the measuring step d in those regions so that when the thickness increases the cutting force is increased and when the thickness decreases the cutting force is decreased (**last three lines** of **step e** of claim 24).

With respect to the first difference (steps a to c) of claim 24) between claim 24 and the disclosures of Bier, the disclosure of Bier describes a method of cutting a glass piece having a predetermined non-rectangular shape from a <u>stationary</u> sheet of glass <u>according to a pattern</u>, as shown for example in figure 4 of Bier and claimed in claim 9 of Bier. Examples of the glass pieces that the method of Bier, et al, is intended to produce are as follows: <u>a blank for a windshield, a sidelight or backlight</u> of the shape shown in fig. 4 of Bier (column 3, lines 32 to 34, of Bier). In fact, Bier teaches that the cutting force should be increased <u>at the corners</u> of the cutting pattern (column 4, lines 49 to 52; method claim 9 of Bier) so that the depth of the score is increased at the corners <u>without regard to the thickness or thickness variations</u>. The sheet of Bier could have the same thickness in every region and at every position but the depth of the score would still be increased at the corners of the pattern.

Furthermore the "brief summary of the invention" section in column 2, lines 13 to 14, of Bier clearly states that the method of Bier makes a "pattern cut", i.e. cuts a piece out of a glass sheet according to a predetermined <u>pattern</u> (also see that last three lines of the abstract of Bier). This method of Bier is different from making a cross-cut "across the glass sheet" of a <u>continuously moving</u> glass sheet

and with the cutting tool moving across the glass sheet at one angle to a travel direction. In the case of claim 9 of Bier the cutting tool must travel in a closed path in directions transversely to the travel direction and also in directions longitudinally to the travel direction as shown in fig. 4. Furthermore claim 8 of Bier does not limit the claimed method to moving the cutting tool at an angle to the travel direction across a moving glass sheet from one side to the other.

In contrast, in the case of applicants' method according to step a of claim 24 the cutting tool moves "across the glass sheet", in order to cut panels from the glass sheet (see page 1, lines 22 to 24, of the applicants' specification). The applicants' method is clearly an improved method of cross-cutting a continuously-produced glass sheet with a cross-cutting machine (e.g. see page 2, lines 13 to 23, and page 7, line 6 and line 24 of the applicants' specification).

Cross-cutting a continuously moving glass sheet according to the applicants' method as claimed in claim 24 is *different* from cutting out a piece from a glass sheet according to a pattern as disclosed in Bier. Hence applicants' method according to claim 24 is patentably distinguishable from the methods disclosed in Bier on these grounds alone.

The new method claims 24 to 28 have been drafted considering the REMARKS in the advisory action that point out that many of the limitations that were the basis for the argumentation in the request for reconsideration filed on May 1, 2008 were not clearly present in the canceled claim 15.

Accordingly claim 24 clearly states in step a) that a continuously moving glass sheet is provided in a first step of the claimed method. In addition to that Bier does not teach the limitation that the cutting tool is moved across the moving glass sheet at an angle to the travel direction of the moving glass sheet because first Bier does not disclose that the glass sheet is moving and second Bier discloses cutting pieces out of the glass sheet according to a pattern so that the cutting tool must move in many different directions across the glass sheet as it follows the pattern, not at one angle to the travel direction as claimed in claim 24.

Furthermore with respect to step d) of claim 24, Bier does not teach a step of measuring the thickness of their glass sheet **for any purpose**. Furthermore step d) **requires more than** simply measuring a thickness of the glass sheet at a single position on the glass sheet or measuring or estimating an average thickness of the glass sheet. Step d) requires that at least two thickness measurements must be made in each of a plurality of different regions across the glass sheet, which are traversed by the cutting tool. In that way the variation in thickness from one region to the other can be measured.

Bier does not disclose a method of cutting the sheet that includes measuring or indeed pre-measuring the thickness of the glass sheet in different regions traversed by the cutting tool as it moves across the glass sheet in order to determine thickness variations or differences of the thickness of the glass sheet in the different regions. Bier does recognize that there are small variations in the thickness of the glass sheet that lead to unwanted, uncontrolled or

unplanned fluctuations in the depth of the score or fissure in the glass sheet (column 1, lines 40 to 47).

Bier does not disclose or suggest pre-measuring thickness differences of the glass sheet in different regions traversed by the cutting tool by any method prior to cutting the piece from the glass sheet so that these differences can be later taken into account during the cross-cutting of the glass sheet to adjust the fissure depth or the cutting force applied to the glass sheet. In contrast, applicants' claimed method of cutting the moving glass sheet states that the pre-measured thickness variations between different regions of the glass sheet are taken into account during the adjusting the cutting force in step e) of claim 24.

Bier's inventive apparatus can perform many different methods of producing score lines or fissures of different depth as it moves according to a predetermined pattern to cut a glass piece from the glass sheet. The depth of fissure produced can be rapidly varied at any point along the fissure or score line by the inventive device of Bier according to any desired plan. The plan for adjusting the cutting force and score depth according to applicants' claims 22 and 24 is not disclosed by Bier.

Bier does **not** disclose that that the cutting force *should* be a function of the varying thickness across the glass sheet as the cutting tool traverses the glass sheet so that the cutting force is increased in regions of greater thickness and decreased in regions of lesser thickness to avoid premature breakage of the glass sheet during cross-cutting. The particular example in Bier in column 3, lines 37 to 58, and Bier's claim 9 teaches that the cutting force is adjusted to be

greater at the corners so as to produce a deeper score at the corners, which presumably makes it easier to punch or otherwise remove the piece out of the glass sheet. The increase in cutting force at the corners occurs regardless of the behavior of the thickness of the glass sheet at the corners according to Bier.

Page 3, last four lines, of the final Office Action (in the section related to the 103 rejection) states that the background section of Bier (column 1, 3rd paragraph) teaches that the cutting tool should be controlled <u>to produce a score or fissure of ***constant*** *depth*</u>. However careful study of the background section of Bier does <u>not</u> reveal any explicit teaching that the depth of the score or fissure should be <u>constant</u>. Column 1, lines 32 to 55, (the background section) does not <u>state</u> that the cutting tool should be controlled to produce a <u>constant</u> <u>depth</u> score or fissure, but only that the cutting tool should have means for <u>rapidly</u> controlling the cutting force so that the depth of the score or fissure can be rapidly adjust according to <u>any</u> plan or program for varying the cutting force with position long the cutting line. In fact, column 1, lines 22 to 27, confirm that Bier is most concerned with changing the cutting pressure at the corners of the cutting pattern -- without regard to the thickness variations in the glass sheet.

In contrast in the case of the applicants' claimed method if the thickness does not change, the cutting force does not change. According to step d) of claim 15 if the thickness of the glass sheet increases, then the cutting force is increased and if the thickness of the glass sheet decreases, then the cutting force is decreased. At best Bier does **not** disclose or suggest **any** specific relationship between cutting force and the thickness of the glass

sheet. In fact Bier suggests changing cutting force at the corners of a cutting pattern where the thickness does not necessarily change.

It is well established that each and every limitation of a claimed invention must be disclosed in a single prior art reference in order to be able to reject the claimed invention as anticipated under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in ***In re Bond***, 15 U.S.P.Q. 2^{nd} 1566 (Fed. Cir. 1990).

Summarizing the differences between the method claimed in claim 24 and the disclosures of Bier, Bier does not disclose:

(1) cutting <u>a continuously moving glass</u> sheet with a cutting tool moving <u>across</u> the glass sheet <u>at **an** angle to its travel direction</u> to form <u>a</u> fissure or score line (**step a to c** of claim 24);

(2) <u>a method of cutting the moving glass sheet</u> that includes measuring or pre-measuring a varying thickness of the glass sheet (**step d** of claim 24) to determine thickness differences between different regions of the glass sheet, such as the edge region and the net region, which are later taken account during the adjusting of the cutting force according to step e) of claim 24; and

(3) adjusting the cutting force applied by the cutting tool to the moving glass sheet in different regions traversed by the cutting tool according to the thickness differences measured during the measuring step d **so that when the thickness increases the cutting force is increased and when the thickness**

decreases the cutting force is decreased (**last three lines** of **step e** of claim 24).

The specific plan for the cutting force described in point 3 above is not disclosed anywhere in Bier. Furthermore generic disclosures of adjusting the cutting force according to a general plan in Bier are not disclosures of the specific plan described in point 3 above for the purpose of preventing premature breakage of the glass sheet into pieces during fissure formation.

For the foregoing reasons it is respectfully submitted that claims 22 to 28 should not be rejected as **anticipated** under 35 U.S.C. 102 (b) by Bier, et al (US Patent 3,756,104).

III. OBVIOUSNESS REJECTION

Claims 15 to 21 were rejected as obvious under 35 U.S.C. 103 (a) over Almar, et al (EP 0 837 042 – referred to as Almar herein below), in view of Bier, et al (US Patent 3,756,104).

Claims 15 to 21 have been canceled obviating their rejection on these grounds. New method claims 22 to 28 have been added as described in section I above.

The Claimed Invention and the Prior Art

In accordance with the guidelines regarding 103 rejections in MPEP 2141 the scope and content of the apparatus and methods of Bier and the differences

between the claimed invention and the disclosures in Bier have been described above in section II of these REMARKS.

Almar does disclose a cross-cutting machine for automatically cutting away panels from a continuously-produced glass sheet. It does include a cutting tool for making a score or fissure in the glass sheet and a pressure applying means for acting on the cutting line or score line to break the sheet into two pieces (column 2, lines 4 to 15). The mechanical means for breaking the sheet are controlled by control and operating means including hydraulic valve means for controlling the cutting or scoring and pressure applying means, which in turn are controlled by an electronic controller 57. The electronic controller 57 does receive signals from a sensor 62 (a camera 63 as shown in fig. 4), which "automatically detects the thickness" of the glass sheet (quote is from column 4, lines 53 to 56 of EP '042).

However the camera 63 is not capable of measuring the thickness variations <u>in a plurality of different regions or at different positions</u> traversed by the cutting tool during formation of the score or fissure in the glass sheet. The measuring sensor 62 (camera 63) only determines a **single average** thickness of the glass sheet and is positioned at a stationary position at the side of the glass sheet to observe the edge of the glass sheet. The purpose of the measuring sensor 62 in the apparatus of Almar is to provide an electronic control signal <u>for selecting the operating program for automatically cross-cutting</u> the sheet on the basis of the <u>single average thickness</u> of the sheet. It is <u>not</u> for the purpose of varying the applied cutting force applied to the glass sheet by the cutting tool as it

traverses various positions and regions along a cutting line <u>in accordance with the respective mreasured thickness values in the corresponding regions or at the different positions</u>.

In contrast applicants' method claimed in claim 22 involves a continuous measurement of the thickness of the glass sheet during the cross-cutting <u>at a plurality of positions that are traversed by the cutting tool</u> during the cross-cutting. In other words the applicants' method comprises measuring the thickness of the glass sheet in at least two different regions of the glass sheet, such as the edge region and the net region, not merely an average glass sheet thickness. The sensor 62 of Almar cannot measure thickness in different regions of the glass sheet because it sits in a fixed position at the side of the moving glass sheet and does not traverse the glass sheet with the cutting tool.

With respect to claim 15, the camera 63 and fixed or stationary sensor 62 would <u>not</u> be able to measure the respective different thicknesses of a glass sheet in corresponding plural regions across the glass sheet, which are traversed with the cutting tool as it forms the fissure or score line.

Furthermore Almar does not disclose or suggest any particular method of varying the cutting force as the cutting tool traverses the glass sheet. <u>Almar does not disclose or suggest the limitations of the step d) of claim 22 and step e) of claim 24, namely that the cutting force is varied according the thickness variations across the glass sheet, **so that the cutting force is greater when the thickness is greater and is lesser when the thickness is lesser.**</u>

The Rationale for the Obviousness Rejection

Turning to the reasons for the obviousness rejection presented on pages 3 and 4 of the final Office Action, the final Office Action states that the background section of Bier teaches applying a variable cutting force to create a constant fissure (constant depth?). However careful study of the background section of Bier does not reveal any explicit teaching that the depth of the score line or fissure should be constant. Column 1, lines 32 to 55, (the background section) does not state that the cutting tool should be controlled to produce a constant depth score line or fissure, but only that the cutting tool should have means for rapidly controlling the cutting force so that the depth of the score line or fissure can be rapidly adjust according to any plan or program for varying the cutting force with position long the cutting line. In fact, column 1, lines 22 to 27, confirm that Bier is most concerned with changing the cutting pressure at the corners of the cutting pattern -- without regard to the thickness variations in the glass sheet.

It is well established that all limitations of a claimed invention must be disclosed or suggested by the prior art for a valid rejection under 35 U.S.C. 103 (a). See MPEP 2143.03.

The single most significant distinguishing limitation that is absent from the disclosures of Almar and Bier individually or in combination with each other is that the cutting force is varied so that it is increased at positions or in regions of greater thickness and is decreased at positions or in regions of less thickness --

so as to prevent premature breakage prior to completion of the fissure across the sheet.

In addition, neither Almar nor Bier disclose a method of cutting a moving glass sheet **including** <u>measuring</u> respective <u>thickness</u> <u>variations</u> or differences in different regions, such as the edge region and the net region, of the glass sheet and controlling or adjusting the cutting force according to the thickness variations.

Thus it is respectfully submitted that a case of *prima facie* obviousness cannot be based on a combination of the disclosures of Bier and Almar. The reasoning on pages 3 and 4 of the Office Action does not meet the burden of providing valid reasons for a case of *prima facie* obviousness under 35 U.S.C. 132 based on a combination of these two prior art references.

Finally one skilled in the art would <u>not</u> combine the disclosures of Almar with Bier under 35 U.S.C. 103 (a) in the manner suggested on pages 3 and 4 of the final Office Action because <u>Bier would lead one skilled in the art away from combining the subject matter of the references in this manner</u>.

Almar, et al, teach a machine or apparatus for cross-cutting a continuously-produced glass sheet that includes cutting means for making a cut along a cutting line and press means that acts to break the sheet on the cutting line, but also that includes control and operating means comprising **proportional valve means**. The proportional valve means is required by their main claim 1, their abstract and the brief summary at column 2, lines 4 to 21. In other words,

the scoring and fissure making tools are pneumatic according to Almar, et al. But Bier clearly teaches that pneumatic cutting tools are **not** adequate because they cannot adjust the cutting force applied by the cutting tool sufficiently rapidly at column 1, lines 16 to 23, of Bier. Thus Bier teaches against a cutting machine or apparatus as claimed in claim 1 of Almar, et al, because it is insufficient for the rapid method of e.g. making cuts in the glass sheet according to a predetermined cutting pattern in which the cut or fissure depth is adjusted during the cutting, e.g. at the corners of the pattern or in general anywhere along the cutting line.

In summary, Bier teaches away from the proposed combination of the subject matter of Almar, et al, with Bier. For example, see M.P.E.P. 2145 X. D. 2.

Also if the cutting mechanism of Bier with the reluctance motor were to replace the pneumatic mechanism in the cutting apparatus of Almar, Almar's apparatus would be modified in a manner such that its basic principle of operation would be changed, **which is not permitted under 35 U.S.C. 103 (a). See M.P.E.P. 2143.01 VI**. The pneumatic mechanism of Almar does not respond fast enough to control the depth of the fissure at various locations across the glass sheet according to Bier.

For the foregoing reasons it is respectfully submitted that new method claims 22 to 28 should not be rejected as obvious under 35 U.S.C. 103 (a) over Almar, et al (EP 0 837 042), in view of Bier, et al (US Patent 3,756,104).

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

Michael J. Striker,
Attorney for the Applicants
Reg. No. 27,233